

In the Claims:

1. (Currently Amended) A method of forming a bottom electrode of a magnetic memory cell, comprising;

before depositing a soft layer material, depositing a sacrificial mask over a bottom electrode material, said sacrificial mask having a thickness selected to avoid the formation of a conductive fence along the sidewalls of the bottom electrode material;

patterning the sacrificial mask;

patterning the bottom electrode material without forming said conductive fence and such that; wherein the sacrificial mask is almost completely consumed while after the patterning of the bottom electrode material.

2. (Original) The method according to Claim 1, wherein the sacrificial mask comprises photoresist, an oxide, or a low dielectric constant material.
3. (Original) The method according to Claim 1, wherein the sacrificial mask comprises a thickness of 1000 to 5000 Angstroms.
4. (Original) The method according to Claim 1, wherein the bottom electrode material comprises a first conductive material and a second conductive material formed over the first conductive material.

5. (Original) The method according to Claim 4, wherein the first conductive material comprises a layer of Ta and a layer of TaN.
6. (Original) The method according to Claim 5, wherein the first conductive material comprises 50-100 Angstroms of Ta and 50-100 Angstroms of TaN.
7. (Original) The method according to Claim 4, wherein the second conductive material comprises PtMn or IrMn.
8. (Original) The method according to Claim 7, wherein the second conductive material comprises 125 to 300 Angstroms of PtMn or IrMn.
9. (Currently Amended) A method of fabricating a magnetic memory device, comprising:
 - providing a workpiece;
 - depositing a first insulating layer over the workpiece;
 - forming a plurality of first conductive lines within the first insulating layer;
 - disposing a bottom electrode material over the first conductive lines and the first insulating layer;
 - depositing a sacrificial mask over the bottom electrode material, said sacrificial mask having a thickness selected to avoid the formation of a conductive fence along the sidewalls of the bottom electrode material;
 - patterning the sacrificial mask; and

using the sacrificial mask to pattern the bottom electrode material and form at least one bottom electrode for a magnetic memory cell without forming said conductive fence and such that, wherein at least a portion of the sacrificial mask is consumed during the patterning of the bottom electrode material, and wherein the bottom electrode is patterned prior to depositing a soft layer of the magnetic memory device.

10. (Original) The method according to Claim 9, further comprising depositing a soft layer over the patterned bottom electrode, after patterning the bottom electrode material.

11. (Original) The method according to Claim 10, further comprising depositing a hard mask over the soft layer.

12. (Original) The method according to Claim 11, further comprising patterning the hard mask, and using the hard mask to pattern the soft layer, wherein the patterned soft layer comprises a magnetic memory cell.

13. (Original) The method according to Claim 12, further comprising:
depositing a second insulating layer over the first conductive lines and first insulating layer;
patterning the second insulating layer with a via pattern;
filling the patterned second insulating layer with conductive material to form a via contacting at least one first conductive line, wherein the via makes electrical contact with a bottom portion of the magnetic memory cell;

depositing a third insulating layer over the patterned bottom electrode; and

forming a plurality of second conductive lines in the third insulating layer, wherein at least one second conductive line makes electrical contact to an upper portion of the magnetic memory cell.

14. (Original) The method according to Claim 9, wherein disposing the bottom electrode material comprises depositing a first conductive material over the first conductive lines and the first insulating layer, and depositing a second conductive material over the first conductive material.

15. (Original) The method according to Claim 14, wherein depositing the first conductive material comprises depositing 50-100 Angstroms of Ta over the first conductive lines and the first insulating layer and depositing 50-100 Angstroms of TaN over the Ta.

16. (Original) The method according to Claim 14, wherein depositing the second conductive material comprises depositing 125 to 300 Angstroms of PtMn or IrMn over the first conductive material.

17. (Original) The method according to Claim 9, wherein the sacrificial mask comprises photoresist, an oxide, or a low dielectric constant material.

18. (Original) The method according to Claim 9, wherein the sacrificial mask comprises a thickness of 1000 to 5000 Angstroms.

19. (Original) The method according to Claim 9, wherein the sacrificial mask is almost completely consumed during the patterning of the bottom electrode material, further comprising removing remaining portions of the sacrificial mask after patterning the bottom electrode material.

20. (Original) The method according to Claim 9, wherein after the patterning of the bottom electrode material, the sacrificial mask has been completely removed.

21. (New) A method of fabricating a magnetic memory device comprising the steps of:
providing a workpiece comprising a plurality of first conductive lines within a first insulating layer;
forming a bottom electrode material over said first conductive lines and said first insulating layer, said bottom electrode material comprising a first conductive layer deposited over said first conductive lines and said first insulating layer and depositing a second conductive layer of material selected from the group consisting of PtMn and IrMn over the first conductive layer;
depositing a sacrificial mask over said bottom electrode;
patterning said sacrificial mask;
using said patterned sacrificial mask to pattern said bottom electrode material to form at least one bottom electrode for a magnetic memory cell and such that said sacrificial mask is substantially consumed;
depositing a soft layer of magnetic memory material over said patterned bottom electrode material;

forming a patterned hard mask of conductive material over said magnetic memory material;
using said patterned hard mask to pattern said soft layer of magnetic memory material so as to form a magnetic memory cell, said magnetic memory cell and said patterned hard mask having a selected thickness;

forming a third insulating layer over said workpiece, said third insulating layer having a thickness substantially equal to said selected thickness; and

forming a plurality of second conductive lines over said third insulating layer such that at least one of said plurality of said second conductive lines makes electrical contact with said patterned hard mask of conductive material.

22. (New) The method of claim 21 wherein said first conductive layer comprises a layer of Tan over a layer of Ta.

23. (New) The method of claim 21 wherein said sacrificial mask has a thickness selected to avoid the formation of a conductive fence along the sidewalls of the bottom electrode.